REMARKS

This is in full and timely response to the above-identified Office Action. The above listing of the claims supersedes any previous listing. Favorable reexamination and reconsideration are respectfully requested in view of the preceding amendments and the following remarks.

Claim Status/Amendments

Claims 1-11 are pending. Claims 1-3 are amended to clarify the subject matter set forth therein. No new matter has been added. Claims 4 -11 remain unamended.

Rejections under 35 USC § 103

1) The rejection of of claims 1-3, 6-9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,707,394 to Ishiara et al. (Ishiara) in view of US 6,084,989 to Eppler, is respectfully traversed.

Re claim 1

The invention relates to a method for estimating the distances from a mobile object or vehicle (hereinafter "mobile object"), to the points of a map of a terrain over which the mobile object is moving, this method taking into account the dynamic properties of the mobile object.

As defined in amended claim 1, the proposed method implements in a new and novel way, a distance transform operating by propagation over an image of the map constituted by elements of a terrain elevation database corresponding to the map and arranged in rows and columns in orders of values of longitude and latitude. In this novel method of implementing a distance transform, a selection is made between the paths catalogued during the application of the chamfer mask to a goal point with a view to searching for the shortest path. For that selection, the catalogued paths have their lengths translated into times of travel for the mobile object and those whose times of travel for the mobile object are such that the goal point would belong to a prohibited zone of passage at the moment at which the mobile object reaches it, are excluded from the search for the shortest path.

Ishihara discloses a device for generating terrain clearance floor envelopes about a selected runway for use in a ground proximity warning system to provide appropriate alerts if the altitude of an aircraft with respect to the underlying terrain is less than the minimum altitude required by the terrain clearance floor envelope (col. 1, lines 44-48). With this device, Ishihara

strives to reduce generation of false alarms by a ground proximity warning system during the landing of an aircraft by using around the runway, a terrain clearance floor envelope which is more precisely determined, taking into account error factors associated with the indicated position of the selected runway and the error associated with the indicated altitude of the aircraft.

Ishihara has nothing to do with an improved method of predicted flight profile. Ishihara only describes how to define a terrain clearance floor envelope with respect to a selected runway allowing a reduction the false alarms during the landing of an aircraft.

As defined in amended claim 2, the claimed invention can be applied to an aircraft having an imposed vertical flight profile. In this case, the vertical flight profile is predetermined and does not have to be predicted. The horizontal flight profile is not predicted but determined by the pilot of the aircraft with the help of the map of the over flown terrain and the knowing of the estimated distances from the aircraft to the different points of the map taking into account the imposed vertical flight profile.

Ishihara does not describe or suggest, in any way, a method for estimating the distances from a mobile object, to the points of a map of a terrain over which the mobile object is moving, while taking into account dynamic constraints imposed on the mobile object.

Eppler discloses a method for locating landmarks in digitized images generated by satellite-based imaging system in order to determine the position and attitude of the imaging system that generates digitized images of the Earth (col.1, lines 9-19). In this way, Eppler determines the position and attitude of the imaging system on the basis of the offsets between the predicted positions of landmarks and their actual positions in the image. To determine these offsets Eppler proposes six different image matching algorithms (col. 6, line 43), the second of which being a edge matching algorithm (col.7, lines 24-42) that uses a nearest edge transform described by G. Borgefors (col. 7, line 37).

The edge matching algorithm detects edges in an image by means of a Laplacian-of-Gaussian algorithm, relativizes the effects of clouds by blurring the detected edges by application of a nearest edge transform to the image of the detected edges and matches the landmark perimeters drawn by the edges in the transformed image by searching a best estimate for all offsets (col. 7, lines 24-59) between actual position of the landmark perimeters drawn by

the edges on the transformed image and the predicted landmark perimeter.

In that edge matching algorithm, the distance transformation is used by Eppler to estimate the distances D from any pixel of the image of the detected edge to the nearest edge pixel (col.7, line 38-40) and does not estimate the distance from only one source point placed on a map in proximity of a mobile object moving over the terrain of the map to any pixel of the image of the map.

Moreover, in this application of a distance transform made by Eppler, associate times of travel to the estimated distances from any pixel of the image of the map to the nearest edge pixel would implicate that the mobile object is near any pixel of the image of the map that is without significance. Furthermore, the fields of the teachings of Ishihara and Eppler are markedly different (generation of clearance floor envelope and adjustment of the pointing direction of an imaging system by means of the offset errors of landmarks in an image) that it seems difficult, to a person of ordinary skill in the art to combine them, in absence of any suggestion do to so.

Re claim 2

Claim 2, as amended, specifies the application of the chamfer mask to a goal point in the implementation of the distance transform in case of a mobile object being an aircraft having an imposed vertical flight profile. In this implementation, the lengths of the paths catalogued during the application of the chamfer mask to a goal point, are associated with the forecastable values of the instantaneous altitudes that the aircraft would have by reaching the goal point via these paths while complying with the imposed vertical flight profile, and the catalogued paths associated with forecastable values of altitude that are less than or equal to the goal point altitude given by the terrain elevation database and increased by a protection margin are excluded from the search for the shortest path. This could not be taught or suggested by Ishara who ignores the use of a distance transform and its scanning of an image by a chamfer mask.

Re Claim 3

Amended claim 3 specifies that, in the implementation of the distance transform, the distance estimations are doubled up with estimations of the forecastable altitudes of the aircraft. As for amended claim 2, this is neither taught nor suggested by the disclosur of the Ishihara reference which ignores the use of a distance transform.

2) The rejection of claim 10 under 35 USC § 103(a) as being unpatentable over Ishihara, as modified by Eppler and combined with the well known work of Borgefors is respectfully traversed.

First, it is difficult to fathom why the knowledge by Bogefors pertaining to the use of the first four passes renders obvious the following four passes that are all different. Applicant respectfully requests the Examiner clarify this position. The nexus with the remaining comments appear to be non-existent.

The rejection further states that it would be obvious to a person of ordinary skill in the art to merge the previously four know methods into new combinations. This sounds very innovative, and innovative to the degree that inventive activity would be required. The motivation that is advanced for this innovative position is advanced as being to provide a propagation-based distance transform when scanning the pixels of the image constituted from the elements of the terrain elevation database corresponding to the map, in a series of eight passes that is repeated until a stabilization of the distance estimates is reached. Just how this conclusion is reached is not clear and if this rejection is to be maintained, it is suggested that the examiner make it clear as to how the teachings which can be gleaned from the art cited in this rejection, would enable a hypothetical person of ordinary skill to reach this conclusion, taking into account the teachings of the art when each is taken as a whole.

3) The rejection of claims 4 and 5 under 35 USC § 103(a) as being unpatentable over Ishihara in view of Eppler and further in view of Feyereisen et al., is respectfully traversed

These claims depend either directly or indirectly from, and therefore are subordinate to, claims 1, 2 and 3. Therefore, for at least the reasons advanced above, neither of Isahara and Eppler or any combination thereof, can be relied upon to provide as basis for further modification.

Further, this rejection acknowledges that the combination of Ishihara and Eppler does not explicitly teach displaying the forecasted deviation in altitude of the aircraft with respect to the ground as color strata. To overcome this admitted shortcoming, Feyereisen et al. is cited as teaching a terrain awareness system in which the tactical terrain information (in color) is superimposed over the monochromatic strategic terrain information.

However, there is nothing advanced as to how this results in the claimed deviations are

derived. Placing the tactical information of the strategic information is one thing, having it generate deviation data is another, color or no color.

Consequently, in view of the above, the present application is believed to be in condition for Allowance. A notice of Allowance is earnestly solicited.

Reconsideration and allowance in view of the foregoing amendments and the following remarks is respectfully requested.

The Examiner is invited to telephone the undersigned, Applicant's attorney of record, to facilitate advancement of the present application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,
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